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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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GIFFORD, KRASS, GROH, SPRINKLE & CITKOWSKI, P.C PO BOX 7021 TROY, MI 48007-7021				
			EXAMINER DUONG, THANH P	
			ART UNIT	PAPER NUMBER
			1764	

DATE MAILED: 08/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/085,193

Applicant(s)

BUXBAUM, ROBERT E.

Examiner

Tom P. Duong

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 and 39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15,20-22,25,29-37 and 39 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Applicant's remarks and amendments filed on June 6, 2006 have been carefully considered. Claims 15, 20-22, 25, 29-37, and 39 are now pending in this application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 29, 32-33, 35, 37, and 39 are rejected under 35 U.S.C. 102(a,e) as being anticipated by LaPierre et al. (6,348,278). Note, the gas purification system is being examined as an apparatus. LaPierre discloses a gas purification system (Fig. 1) comprising: a feed pump (85, 86); a reactor-purifier system [Fig. 9, (12)] comprises a separate reactor (12) and purified system (14) for generating purified hydrogen (via line 40) by transmission through a hydrogen selective membrane (14) and a raffinate stream from a feed (via line 32), the feed provided by said feed pump; a burner (94) for combusting the raffinate produced by said reactor-purifier system to yield a heated exhaust gas (100), heat (Col. 10, lines 38-42) from said burner being used to heat said

reactor-purifier system; a back pressure regulator (47 A) intermediate between said reactor and said burner and regulating flow of said raffinate therebetween; and raffinate stream (48) and a source of air (98) is fed to the burner (94) as shown in Fig. 1; a fuel cell (52) receiving the hydrogen (via line 40) from said reactor (14); a means for combining additional fuel (via line 96) with the raffinate flow (via line 48); heated material is a condensing heat transfer fluid (Col. 8, lines 56-58) (best understood by examiner to be the membrane of the reactor). The recitation with respect to mixing the air with the raffinate before combustion in said burner does not further add structural limitation to the claimed invention. Note, instant claims structurally read on the apparatus of LaPierre et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 29, 32-33, 35, 37, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over LaPierre et al. (6,348,278) in view of Verill et al. '800. Note, the gas purification system is being examined as an apparatus. LaPierre discloses a gas purification system (Fig. 1) comprising: a feed pump (85, 86); a reactor-purifier system [Fig. 9, (12)] comprises a separate reactor (12) and purified system (14) for generating

purified hydrogen (via line 40) by transmission through a hydrogen selective membrane (14) and a raffinate stream from a feed (via line 32), the feed provided by said feed pump; a burner (94) for combusting the raffinate produced by said reactor-purifier system to yield a heated exhaust gas (100), heat (Col. 10, lines 38-42) from said burner being used to heat said reactor-purifier system; a back pressure regulator (47 A) intermediate between said reactor and said burner and regulating flow of said raffinate therebetween; and raffinate stream (48) and a source of air (98) is fed to the burner (94) as shown in Fig. 1; a fuel cell (52) receiving the hydrogen (via line 40) from said reactor (14); a means for combining additional fuel (via line 96) with the raffinate flow (via line 48); heated material is a condensing heat transfer fluid (Col. 8, lines 56-58) (best understood by examiner to be the membrane of the reactor). With respect to the recitation of a "reactor-purifier system", the apparatus of LaPierre structurally reads on the apparatus of the claimed invention. For purpose of argument, Verill et al. '800 makes it clear that it is desirable to provide a purifier system integrated with the reactor to provide a compact system for generating hydrogen (Col. 1, lines 5-14) as a fuel source for fuel cell. Thus, it would have been obvious in view of Verill et al. '800 to one having ordinary skill in the art to modify the apparatus of LaPierre by making the purify system integrally with the reactor to provide a compact system. Moreover, it would have been obvious in view of the applied references to one having ordinary skill in the art to provide a hydrogen purify system integral with the reactor since the use of a one piece construction instead of the structure disclosed in the prior art would be merely a matter of obvious engineering choice. See *Schenck v Nortron Corp.* and *In re Larson*.

MPEP 2144.04. Note, the recitation with respect to mixing the air with the raffinate before combustion in said burner does not further add structural limitation to the claimed invention.

3. Claims 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Verill et al. '800 in view of Keskar '591. Note, the gas purification system is being examined as an apparatus. Verill discloses a gas purification system (Fig. 1-3C and 4) comprising: a reactor (Fig. 4) operating above room temperature having a reactor volume and a reactor wall having an interior side and an exterior side, and defining a communicating portal therebetween for a mixed gas flow; a gas selective membrane (500) within the reactor volume, said gas membrane in contact with the mixed gas flow and selectively passing a constituent gas of the mixed gas flow therethrough, such that a raffinate (315) of the mixed gas flow is retained in contact with said membrane; an outlet channel (outlet port 315) for removing said raffinate from contact with said selective membrane; a passageway (520) for the removal of the constituent gas from the interior of said reactor; and a fuel cell (340) powered by constituent gas (via line 330). With respect to the venturi compressor disposed in the outlet channel, Verill discloses a turboexpander 310, which has the same function of depressurized the off-gases as the claimed venturi. Thus, it would have been obvious in view of Verill to one having ordinary skill in the art to substitute the compressor of venturi type in lieu of the turboexpander of Verill to decreased the pressure of the off-gases, since it has been held by the court that substituting equivalents known for the same purpose is within the level of ordinary skill in the art. See *In re Ruff*, 256, F.2d 590, 118 USPQ 340 (CCPA

1958). Alternatively, Keskar '591 teaches it is conventional to provide a venturi educator 108 to reduce the pressure of the retentate stream 89 and the venturi educator 108 provides sufficient pressure and/or flowrate which makes it possible to achieve the desired recirculation rate for the exhaust gas stream (Col. 8, lines 6-16). Thus, it would have been obvious in view of Keskar to one having ordinary skill in the art to modify the apparatus of Verill with a venturi compressor as taught by Keskar in order to gain the above benefits.

4. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (Verill et al. '800 in view of Keskar '591) in view of Epp et al. '515. The applied references fail to disclose at least one of an oxygen sensor. Epp et al. '515 teaches it is desirable to provide an oxygen sensor 361 at the burner outlet stream 321 of the catalytic burner 319 to detect the oxygen concentration of the burner outlet stream. Thus, it would have been obvious in view Epp '515 to one having ordinary skill in the art to modify the system of the applied references with an oxygen sensor as taught by Epp in order to detect the oxygen concentration in the burner outlet stream.

5. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (LaPierre '278 in view Keskar '591) and further in view Prasad '932. The applied references disclose the claimed invention except a feed liquid compression means to convey the mixed gas to the reactor. Prasad '932 teaches a compressor (2) is used to elevate the pressure of the feed gas to the desired upper membrane pressure to facilitate the separation process. Thus, it would have been obvious in view of Prasad

to one having ordinary skill in the art to modify the apparatus of the applied references with a compression means as taught by Prasad '932 in order to elevate the pressure of the feed stream to the separator, which improves the separation process.

6. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (LaPierre '278 in view Keskar '591) and further in view Han et al. (6,896,709). The applied references essentially disclose the claimed invention except a mix controller to adjust the ratio of the raffinate and the air to the burner. Han teaches a mix controller with a raffinate controller 23 and an air/fuel control valve 2 to regulate the amount of gas mixture to the catalytic burner 9 to be utilized as a fuel source, which increases the energy efficiency of the fuel reformer (Col. 8, lines 37-44). Thus, it would have been obvious in view of Han '709 to one having ordinary skill in the art to modify the apparatus of the applied references with a mix controller system as taught by Han in order to regulate the raffinate and air ratio to the catalytic burner.

7. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (LaPierre '278 in view of Keskar '591 and Han '709) and further in view of Epp et al. '515. The applied references disclose the claimed invention except an oxygen sensor. Epp et al. '515 teaches it is desirable to provide an oxygen sensor 361 at the burner outlet stream 321 of the catalytic burner 319 to detect the oxygen concentration of the burner outlet stream and control the amount of oxygen to the burner (via pump 357). Thus, it would have been obvious in view Epp '515 to one

having ordinary skill in the art to modify the system of the applied references with an oxygen sensor as taught by Epp in order to detect the oxygen concentration in the burner outlet stream.

8. Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over the applied references (LaPierre '278 in view Keskar '591) and further in view of Edlund (6,383,670). The applied references disclose the claimed invention except a feed pump controller to adjust the feed rate in response to hydrogen output pressure. Edlund '670 shows a controller (28) with sensor lines connected to the hydrogen output (50) and feed assembly (18) to control the amount of feed into the hydrogen producing region (34) based on the amount of hydrogen produce in the hydrogen output (50). Thus, it would have been obvious in view of Edlund '670 to one having ordinary skill in the art to modify the apparatus of the applied references with a feed controller as taught by Edlund '670 in order to control the feed flow rate to the system based on the hydrogen output.

9. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over applied references (LaPierre '278 in view Keskar '591) and further in view Edlund (6,383,670). The applied references fail to disclose a fuel flow controller to adjust the rate of the additional fuel flow in response to the temperature of the reactor-purifier system. Edlund teaches a controller 28 is used to control the temperature in the hydrogen-producing region 34 by adding additional fuel as required to maintain the temperature in the catalyst bed (Col. 5, lines 32-55 and Col. 6, lines 19-39). Thus, it would have been obvious in view of Edlund to one having ordinary skill in the art to modify the apparatus

of the applied references with a fuel controller system as taught by Edlund in order to control the temperature in the reactor by adjusting the fuel flow rate.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claim 20 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,923,944 in view of Kesar (6,106,591). Although the conflicting claims are not identical, they are not patentably distinct from each other because USPN '944 claims substantially the same subject matter as the instant claim except a reactor "operating above room temperature". However, the reactor of USPN '944 is capable of operating above room temperature as the instant claim being the fact that USPN '944 discloses a reactor with

the same features as the instant claim. Furthermore, the recitation of "operating above room temperature" in the instant does not impart structural limitation. With respect to the raffinate compressor disposed in the outlet channel, Keskar '591 teaches it is conventional to provide a venturi educator 108 to reduce the pressure of the retentate stream 89 and the venturi educator 108 provides sufficient pressure and/or flowrate which makes it possible to achieve the desired recirculation rate for the exhaust gas stream (Col. 8, lines 6-16). Thus, it would have been obvious in view of Keskar to one having ordinary skill in the art to modify the apparatus of USPN '944 with a raffinate compressor as taught by Keskar in order to gain the above benefits.

Response to Arguments

Applicant's arguments filed June 6, 2006 have been fully considered but they are not persuasive. (1) The argument with respect to the 102(b) rejection with respect to claims 20 and 22 is moot in view of new ground of rejection as described above paragraph three. Keskar '591 teaches the raffinate compressor of the claimed invention. (2) With respect to the 102 (a,e) rejection anticipated by LaPierre, Applicant argues LaPierre disclose a reactor 12 which is separate from a purified system 14. Claim 29 merely recites a reactor-purifier "system" for purified hydrogen by transmission through a hydrogen selective membrane. LaPierre shows reactor 12/hydrogen separating membrane 14 "system" for purifying hydrogen. Furthermore, the new ground of rejection in paragraph two addresses the compactness of providing a system wherein the hydrogen purifier integrally within the reactor. (3) Applicant argues the teaching of

venturi educator of Keskar et al. has a different function than the claimed invention and such argument lacks merit since the applied references disclose the structure of the claimed invention. Note, an apparatus claims cover what a device is, not what a device does. *Hewlett-Packard Co. v. Bausch & Lomb Inc.* MPEP. 2114. (4) With respect to the argument of the dependent claim 25, Epp '515 teaches the oxygen sensor of the claimed invention and the argument with respect to the functionality of the rest of the components of Epp '515 in connection with the oxygen sensor lacks merit. (5) Applicant argues the Han's reference fail to disclose or suggest a mix controller adjusting the ratio of said raffinate in said air provided to said burner. Examiner respectfully disagrees. Han's reference clearly discloses a mix controller (23) for adjusting the ratio raffinate and air (Fig. 7 and Col. 8, lines 37-44). (6) The argument with respect to the feed controller to control the feed flowrate versus hydrogen output is now addressed by the teaching reference of Edlund '670 in paragraph eight. (7) With respect to argument of the fuel flow controller in claim 36, Edlund '670 teaches a controller 28 that monitors the temperature in the catalyst bed by adjusting the fuel flowrate (via line 62, Fig. 2; and Col. 5, lines 33-55 and Col. 6, lines 19-39).

With respect to the remarks on obviousness-type double patenting of claim 20, Keskar '591 teaches the missing feature of a compressor. Note, claim 1 of USPN '944 fully encompasses claim 20 of the claimed invention.

Conclusion

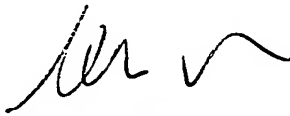
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tom P. Duong whose telephone number is (571) 272-2794. The examiner can normally be reached on 8:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tom Duong
August 14, 2006

TD


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